REMR MATERIAL DATA SHEET CM-PC-1.21

CONCRETE PATCHING MATERIAL: RAPID SET CEMENT

1. NAME

Rapid Set Cement

2. MANUFACTURER

Rapid Set Products
Midwestern Regional Office
1211 South 6th Street
St. Charles, IL 60174
Telephone: 312-773-4949

3. DESCRIPTION

Rapid Set Cement is a hydraulic cement. It is similar to portland cement in manufacture and use. The chemical constituents of Rapid Set Cement are the same as those used in ASTM Type K Shrinkage Compensated Cement. However, Rapid Set Cement Concrete neither expands nor shrinks. Rapid Set Cement Concrete sets up rapidly and gains strength at low temperatures (to 22°F).

4. USES AND LIMITATIONS

Uses: Rapid Set Cement is used to patch pavement and sidewalks. It is easy to place (5- to 6-in. slump) in patches one-foot thick to featheredge. Setting time can be controlled in the field from 15 to 45 min with Rapid Set Products Set Control Retarder. The patch is ready for traffic in one hour, eliminating the need for barricades and preventing the scratching of names and "artwork" into the patch. The material bonds to both concrete and asphalt and does not shrink. Because it works in cold weather, it extends winter working time.

5. MANUFACTURER'S TECHNICAL DATA

Performance properties:

Freeze-thaw resistance, ASTM C 666, Relative modulus of elasticity

72 cycles	97.9%
180 cycles	89.1%
252 cycles	84.1%
300 cycles	82.4%

Scaling resistance to deicing chemicals, ASTM C 672

15 cycles	No scaling
60 cycles	Very slight scaling
90 cycles	Slight to moderate scaling

6. MANUFACTURER'S GUIDANCE FOR APPLICATION

Preparation: All broken pavement should be removed from the area to be patched.

Mixing: The concrete mixture proportion is the same as that used for a portland-cement concrete patch, except Rapid Set Cement is substituted for portland cement. The same weight of Rapid Set Cement as portland cement is used. Place Rapid Set Concrete at 6 in. plus 1 in. slump. Setting time may be adjusted at the jobsite using Rapid Set Products Set Control dry powder retarder. Temperature dictates the amount of Set Control retarder to be used. Under-sanded mixes may tend

to segregate when the Set Control retarder is used. Should segregation occur, add additional sand to the mixture.

7. CORPS OF ENGINEERS' EVALUATION

Technical data:

Properties	Test Method	Results (Chart 1)	Results[3] (Air-Entrained) (Chart 2)
Compressive strength, psi	ASTM C 109		
	1 hr	2,140	
	2 hr	2,650	
	3 hr	3,020	
	ASTM C 39		
	24 hr	3,650	
	28 days	5,360	4,590
Modulus of elasticity, psi	ASTM C 469		
	24 hr	3.88×10^6	
	28 days	4.22×10^6	
Flexural strength, psi	ASTM C 78		
	24 hr	540	
	28 days	1,260	860
Bond to concrete, psi	ASTM C 882		
	24 hr	1,920	
	28 days	2,680	
Shrinkage, percent	GR-83-10*		
	(unconfined condition)[1]	0.080	
	(concrete patch)[2]	0.007	

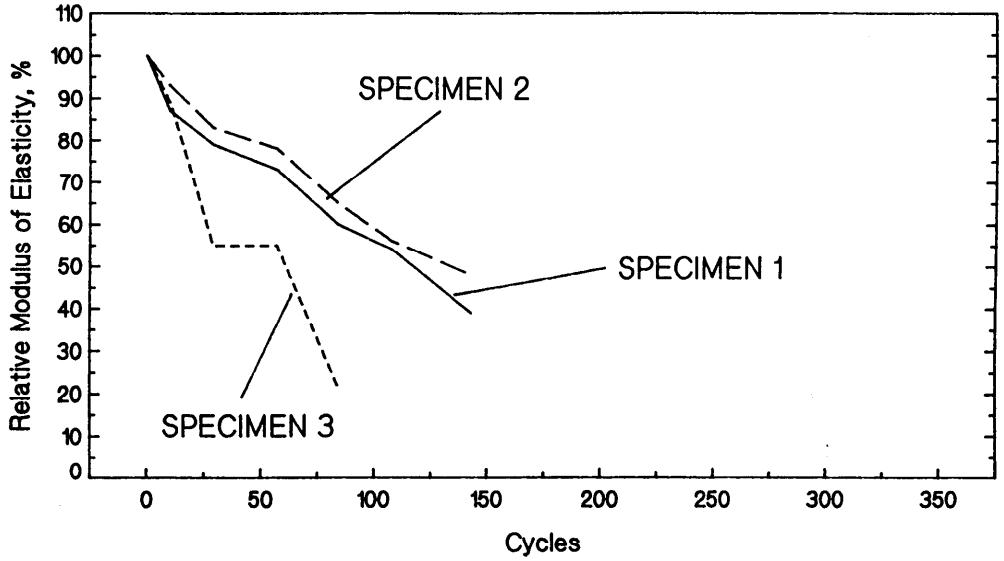
* Bureau of Reclamation Technical Report Standard.

1 An exotherm of 10°F was reported on the shrinkage specimen having a mixture proportion of 17.8% cement, 46.6% natural sand, 35.6% 3/8-in. limestone, and a w/c ratio of 0.45.

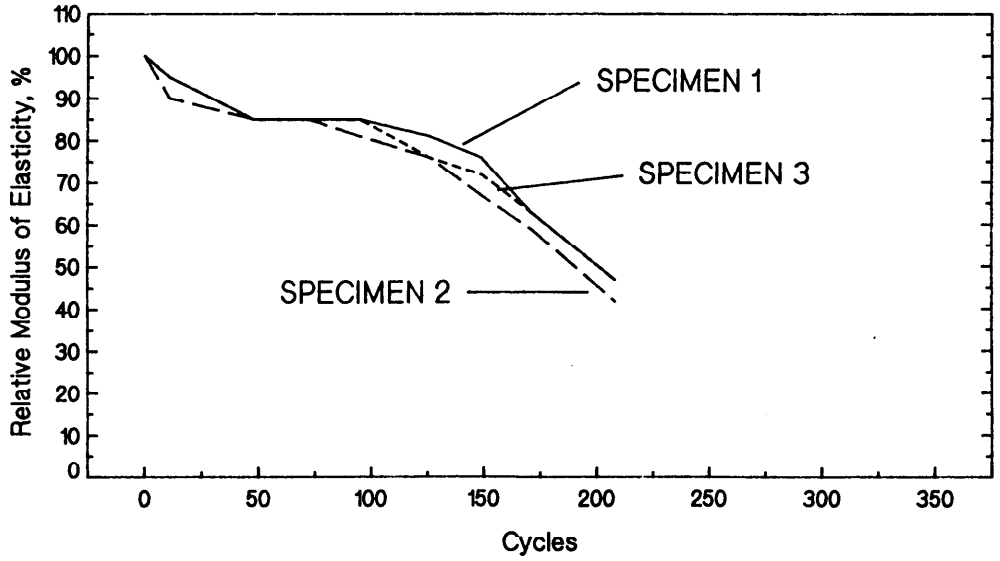
2 An exotherm of 8°F was reported on this specimen with the same mixture as above.

3 The manufacturer recommends adding air-entrainment for better durability. WES tested a mixture consisting of the manufacturer's packaged material and a Hunts Process air-entraining agent at a dosage rate of 1 oz/100 lb cement.

Rapid Freezing and Thawing ASTM C 666, Relative Dynamic Modulus of Elasticity, %



Rapid Freezing and Thawing ASTM C 666, Relative Dynamic Modulus of Elasticity, % with air entraining admixtures



Guidance for application:

Field performance data: In January, 1986, concrete made with Rapid Set Cement was placed on streets at Maxwell AFB, Montgomery, Alabama. The only report on the material is that the large 3 ft- × 18 ft- × 4-in.-deep patch on 3rd Street was holding up well after one year of service.

In March of 1986 four areas of the airfield pavement at Tyndall AFB, Florida, were repaired with a concrete made with Rapid Set Cement. All areas were repaired full depth except one. The patches were inspected the morning after repair, and no shrinkage was indicated. After one year of service, the patches are holding up well.

8. ENVIRONMENTAL CONSIDERATIONS

Reasonable caution should guide the preparation, repair, and cleanup phases of activities involving potentially hazardous and toxic chemical substances. Manufacturer's recommendations to protect occupational health and environmental quality should be carefully followed. Material safety data sheets should be obtained from the manufacturers of such materials. In cases where the effects of a chemical substance on occupational health or environmental quality are unknown, chemical substances should be treated as potentially hazardous toxic materials.

9. AVAILABILITY AND COSTS

Availability: Through various distributors throughout the US in 50-lb polyethylene lined bags. Also available in some locations in bulk.

Costs: From $16.50 to $19.00 per 50-lb bag.

10. TECHNICAL SERVICES

Contact Rapid Set Products for technical information and applications.